UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

EC

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/727,718	11/30/2000	Julian Van Erlach	XILL-3095	4074

5409 7590 07/24/2003

ARLEN L. OLSEN
SCHMEISER, OLSEN & WATTS
3 LEAR JET LANE
SUITE 201
LATHAM, NY 12110

EXAMINER	
PASS, BARRY	

ART UNIT	PAPER NUMBER
3737	12

DATE MAILED: 07/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/727,718	Applicant(s) ERLACH ET AL.	
	Examiner Barry Pass	Art Unit 3737	

-- The MAILING DATE of this communicati n appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *amendment filed 03 July 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9 and 11-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9 and 11-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *26 July 2002* is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Specification

The amendment filed July 3, 2003 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: in the claims a new exclusionary feature "encapsulating is not within a white blood cell" is introduced.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Objections

1. Claim 2 objected to because of the following informalities: Claim 2 has been amended but bracketing and underlining have not indicated the changes. The claim will be examined.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims1-9 and 11-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

4. Encapsulating a microdevice or nanodevice is critical or essential to the practice of the invention as amended and is included in the claims but is not enabled by the disclosure. The teaching "encapsulating a microdevice" can have different meanings in the art. It may simply teach a microdevice inside a containing object such as a cell or it may teach coating the microdevice or placing it within a microcapsule for subsequent insertion into a cell. The recitation of claim 1, in view of the new exclusionary limitation "not within a white blood cell" appears to indicate the first teaching of having the device inserted into and thus surrounded by a cell. However, claim 5 teaches inserting the microdevice into a cell. This teaching appears to be incompatible with a device that has already been located within a cell. There is no teaching in the specification to unambiguously indicate to someone skilled in the art what steps are required for encapsulation. For the purposes of examination encapsulation will be interpreted to mean simply contained within a cell.

5. Claims1-9 and 11-19 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for inserting into a red blood cell and into circulating cells does not reasonably provide a teaching for the new exclusionary feature of not inserting/encapsulating within a white blood cell, which is a circulating cell. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims because the criticality of not inserting into a white blood cell is not disclosed.

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible

harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 1-9 and 11-19 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting, set forth in *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993), as being unpatentable over claims 11-6, 8-10, 12-17 of the inventive entity's copending application no. 09727749. Although not all of the conflicting claims are identical, there is duplication and the remaining claims are not patentably distinct from each other because the broader claims of this application, which teach inserting a nanodevice into a fluid stream in the body, location of the nanodevice intra- or extracellularly, incorporating a microcircuit in the nanodevice, detection of the nanodevice, and facilitating binding of the nanodevice to target molecules anticipate and, in part, duplicate the more specific invention of a nanodevice to monitor a bodily condition disclosed in Application No. 09727749.

This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 1-3, 5, 6-9, 11, 14 and 15, as best understood, are rejected under 35 U.S.C. 103(b) as being unpatentable over Benjamin et al. US 4,793,825. Benjamin et al. discloses (abstract) a method and system for injecting a microdevice into the vascular system or inserting into a white blood cell (column 15, lines 33-38) using a microdevice carrying circuits for signal processing, the circuits containing silicon (abstract), phosphorous (column 11, lines 47-50), providing output (abstract), transmitting information (column 16, lines 30-33). Further, Benjamin et al. discloses (column 15, lines 33-37) encapsulating a microdevice in a cell. Benjamin et al. also teach a white blood cell as an example of a cell for encapsulating. In the absence of any demonstration of criticality in the disclosure of the invention for not encapsulating within a white blood cell, it would have been obvious to someone of ordinary skill in the art at the time of the invention that Benjamin et al. is not teaching encapsulating only into a white blood cell and that the teaching of Benjamin et al. can be used with cells that are not a white blood cell.

Regarding claims 3 and 8, Benjamin et al. does not expressly disclose a red blood cell. However, because different cell types were art-recognized equivalents at the time of the invention in regard to methods of inserting into a cell, one of ordinary skill in the art would have found it obvious to substitute one cell type for another for the purpose of inserting a nanoprobe into a cell to monitor intracellular environments.

Regarding claims 9 and 11, Benjamin teaches implants comprising silicon and phosphorus (abstract, column 11).

11. In the alternative, claims 1-8 and 15, as best understood, are rejected under 35 U.S.C. 103(a) as obvious over Vo-Dinh.

Referring to claim 1 and 15, Vo-Dinh discloses in column 2, lines 18-41, delivering nanoprobes inside organisms and injecting into cells, detecting bodily indicators, and intracellular and extracellular diagnosis by the nanoprobes. Further, Vo-Dinh discloses a nanoprobe having a circuit element (column 2, lines 42-48 and column 3, lines 23-55). Vo-Dinh does not teach delivering the nanoprobe into a fluid stream within a body. However, it would have been obvious to someone of ordinary skill in the art at the time of the invention that the methods disclosed by Vo-Dinh for delivering nanoprobes into an organism for medical diagnosis would include the capability of inserting the nanoprobes into a fluid stream of a body if that stream is in a blood vessel. Also, it is well known in the art that the extracellular environment recited by Vo-Dinh contains streams of fluids.

Referring further to claim 15, Vo-Dinh discloses in column 2, lines 35-41, delivering a nanoprobe into an organism for extracellular diagnosis.

Vo-Dinh does not expressly teach not inserting into, and hence encapsulation not within a white blood cell. In the absence of any teaching of criticality it would have been obvious to someone of ordinary skill in the art that a possible design choice is to choose a cell type that is not a white blood cell.

Referring to claim 2 Vo-Dinh discloses a method of insertion, and hence encapsulation as recited in claim 1; in the abstract teaches injecting nanoprobes into cells; in column 2, lines 37-39 and column 5, lines 65-68 and column 6, lines 1-22, Vo-Dinh teaches methods for delivering nanoprobes inside a cell.

Referring to claim 4 Vo-Dinh discloses a method of insertion into, and hence encapsulation by a cell as recited in claims 1 and 2, and teaches in column 5, lines 65-68 and column 6, line 1 inserting nanoprobe materials into a cell by micro injector.

Referring to claim 6 Vo-Dinh discloses a method of insertion, and hence encapsulation as recited in claim 1 and in column 2, lines 33-37 a nanoprobe as a detector for toxic chemicals and biological indicators.

Referring to claim 7 Vo-Dinh discloses a method of insertion, and hence encapsulation as recited in claim 1. It would have been obvious to someone of ordinary skill in the art at the time of the invention that insertion into organism as described by Vo-Dinh is equivalent to insertion into a biological member as described in the invention.

Referring to claims 3, 5 and 8, Vo-Dinh teaches in column 6, lines 1-22, methods for delivering nanoprobes inside a cell. Vo-Dinh meets the limitations of claim 5 except that it does not specify a cell type. However, because different cell types were art-recognized equivalents at the time of the invention in regard to methods of inserting into a cell, one of ordinary skill in the art would have found it obvious to substitute one cell type for another for the purpose of inserting a nanoprobe into a cell to monitor intracellular environments.

12. Alternatively, claims 3, 5 and 8, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Vo-Dinh in view of Hadlaczky et al. US 6,077,697. Vo-Dinh discloses a method of insertion into an organism or biological member as recited in claim 1. Further, in column 6, lines 1-22, Vo-Dinh teaches methods for delivering nanoprobes inside a cell as recited in claim 2. Vo-Dinh does not teach cell types. Hadlaczky et al. teach in column 5, lines 28-41, methods of inserting (including microinjection and electroporation) into cells. Hadlaczky et al. also teach cell types including cells from plants, insects, reptiles, amphibians, and mammals, stem cells, lymphocytes and neural cells. Accordingly, it would have been obvious to someone of ordinary skill in the art at the time of the invention that microinjection and other insertion techniques as taught by Vo-Dinh can be used on the cell types recited in the claims of the invention.

13. Claim 9, 11 and 14, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Vo-Dinh in view of Peeters or, alternatively, claim 11 is unpatentable over Benjamin et al. in view of Peeters.

Referring to claims 9 and 14 Vo-Dinh teaches a nanodevice circulating or stationed in the body as recited in claim 1. Vo-Dinh does not teach a substrate made of well-known semiconductor materials gallium arsenide, silicon, silicon oxides or germanium. Peeters, in the abstract, column 1, lines 14-1, and column 4, lines 14-18 and 41-45, teaches nanoelectrode arrays built with substrates comprised of silicon, germanium, gallium arsenide, or other semiconductors to detect, characterize and quantify single molecules in a solution such as individual proteins, complex protein mixtures, DNA and other molecules for disease or for pre-disease diagnosis. It would have been obvious to one having ordinary skill in the art at the time of the invention was made that a nanodevice or microdevice in a fluid stream in the body having a circuit element to facilitate the detection and diagnosis of bodily conditions as taught by Vo-Dinh could incorporate a nanoelectrode array as taught by Peeters, that is capable of quantifying biologically significant molecules in a fluid medium, such as individual proteins, complex protein mixtures, DNA and other molecules, for disease or for pre-disease diagnosis.

Referring to claim 11 Vo-Dinh or, alternatively, Benjamin et al. teach a nanodevice circulating or stationed in the body as recited in claim 1. Vo-Dinh or, alternatively, Benjamin et al. do not teach a (oscillating) resonance type device. Peeters, in column 9, lines 45-46, and column 10, lines 1-19, teaches detection of resonance type nanoelectrode arrays. It would have been obvious to one having ordinary skill in the art at the time of the invention was made that a nanodevice or microdevice in the body to detect and diagnose as taught by Vo-Dinh or, alternatively, Benjamin et al. can be provided with any passive or active function within the

capabilities of nanoelectrodes and, in particular, can have that array constructed as a resonance device to enable detection.

14. Claims 12-14, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Vo-Dinh in view of Østensen et al. US Patent No. 6,375,931 or, alternatively, Benjamin et al. in view of Østensen et al.

Referring to claim 12 Vo-Dinh or, alternatively, Benjamin et al. teach a nanodevice inserted and within a body as recited in claim 1. Vo-Dinh or, alternatively, Benjamin et al. do not teach detecting the device by magnetic resonance. Østensen et al., teach in column 5, lines 53-67, and column 18, lines 41-45, micro- and nanoparticles circulating in a body and detectable by magnetic resonance for medical diagnosis. It would have been obvious to one having ordinary skill in the art at the time of the invention was made that a nanodevice or microdevice inserted and within in a body as disclosed by Vo-Dinh or, alternatively, Benjamin et al. can be a device detectable by the magnetic resonance techniques well-known in the art of nuclear magnetic resonance, electron spin resonance, and electron paramagnetic resonance (EPR).

Referring to claim 13 and 14 Vo-Dinh, or, alternatively, Benjamin et al. and Østensen et al. teach a nanoprobe detectable by magnetic resonance as recited in claims 1 and 12. Vo-Dinh, or, alternatively, Benjamin et al. and Østensen et al. do not teach molecules or compounds detected by EPR. It would have been obvious to one having ordinary skill in the art at the time of the invention was made that a nanodevice or microdevice inserted and within a body as disclosed by Vo-Dinh or, alternatively, Benjamin et al., and able to respond to EPR detection would incorporate substances well-known in the art to respond to EPR detection such as odd electron

molecules or any of the well-known paramagnetic substances recited in claim 13, or an organic free radical as recited in claim 14.

15. Claims 16-18, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Vo-Dinh or, alternatively, Benjamin et al. as applied to claim 15 above further in view of Schechter et al. US Patent No. 4,120,649.

Referring to claim 16 Vo-Dinh or, alternatively, Benjamin et al. teach a nanodevice circulating or stationed in the body as recited in claim 15 but do not teach treatment of the circulating or stationary device to prevent immunologic response and prolong tissue retention. Schechter et al. teach in the abstract the treatment of transplants with a compound to improve biological function by reducing antigenicity and prolonging retention by the host. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to treat a nanodevice or microdevice inserted and within in a body as disclosed by Vo-Dinh or, alternatively, Benjamin et al. with a compound to improve biological function by reducing antigenicity and prolonging retention by a body. Further, in regard to claims 17 and 18, it is well known in the art that organo hydroxyls, including ethylene glycol, reduce immune system response and increase retention by tissues.

16. Claims 17-19, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Vo-Dinh or, alternatively, Benjamin et al. as applied to claim 15 above further in view of Dustin et al. Patent No. 5,071,964. Vo-Dinh or, alternatively, Benjamin et al. teach a nanodevice circulating in the body but do not teach addition of a lipid anchor, using an organo hydroxyl, to the circulating device to facilitate its attachment to cell membranes. Dustin et al.

teach in the abstract the use of lipid anchors to enable the attachment of circulating micelles to a variety of target molecules on a cell. Further, it is well known in the art that organo hydroxyls (e.g. ethylene glycol) are used as cross-linking molecules that can be modified to have little effect on the chemistry of the molecules being linked. Accordingly, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to provide a nanodevice or microdevice in the body with a lipid anchor to promote attachment of the device to a cell and thereby prolong its presence in a body and enhance its diagnostic or therapeutic function.

17. Alternatively, claims 17-19, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Vo-Dinh or, alternatively, Benjamin et al. as applied to claim 15 above further in view of Li et al. Patent No. 6,090,408. Vo-Dinh or, alternatively, Benjamin et al. teach a nanodevice circulating in the body but do not teach addition of a lipid anchor, using an organo hydroxyl, to the circulating device to facilitate its attachment to cell membranes. Li et al. teach in the abstract, column 14, lines 59-67, and column 15, lines 1-5, the use of ethylene glycol as a lipid anchor to enhance the attachment of circulating microparticles (liposomes) to reduce clearance by the reticuloendothelial system and thereby increase the medical effectiveness of the microparticles. Accordingly, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to provide a nanodevice or microdevice in the body with a lipid anchor to promote attachment of the device to a cell and thereby prolong its presence in a body and enhance its diagnostic or therapeutic function.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kopelman et al. US 6,143,558 teaches encapsualtion of a nanodevice or microdevice within a cell.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barry Pass whose telephone number is (703) 305-0726. The examiner can normally be reached on Monday-Friday, 8am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Jaworski can be reached on (703) 308-3061. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-0758 for regular communications and (703) 308-0758 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0873.

Barry Pass
July 18, 2003

George Manuel
Primary Examiner